To: Black, Ned[Black.Ned@epa.gov]; Guria, Peter[Guria.Peter@epa.gov]
From: Hiatt, Gerald
Sent: Tue 8/11/2015 10:51:07 PM
Subject: RE: Additional Gold King Mine statement/update 8/10

To date, all I've seen are the prelim data from the Upper Animas River collected on 8/5 and 8/6 – many of these samples appear to be from Cement Creek before it empties into the Animas. As a "worst case", I started with the sample (8/5, 16:15; 085-1482) showing the highest iron concentration – this sample appears to be unfiltered therefore representing total, not dissolved, metal concentrations and appears to have been collected on Cement Creek near Silverton . Many of the concentrations (including the iron concentration) in this sample are flagged D for "diluted value qualifier" so they be biased high due to dilution by the analytical lab and/or have considerable uncertainty. All down-stream samples were significantly lower in reported metals concentrations (notably so for Baker's Bridge, approx. 2/3 of the way between Silverton and Durango, and 32nd Street Bridge, just upstream from Durango) – although I don't know if the "pulse" had reached these locations by the time sampling occurred.

I compared the reported values to R8's screening levels (SLs) for a 60-day-recreational on-river exposure:

•□□□□□ Arsenic: Of the metals for which R8 generated SLs, only arsenic (1,080 D ug/L) was above the 60-day-recreational SL, which is based on the 10-6 excess lifetime cancer risk (ELCR) concentration (i.e., is at the most protective end of EPA's protective exposure range = 10- to 10-4 ELCR). Given that a sample (8/6, 06:30; 085M-1486) collected at the same location a little over 14 hours later showed an arsenic concentration (15.7 D ug/L) 69-fold lower it would be unreasonable to react to a risk estimate based on the 8/5, 16:15 sample - this is because the actual exposure period would be significantly shorter that the 60 days assumed in the R8 recreational SL. Similarly, a risk estimate developed from the 8/6, 06:30 sample using the 60-day-recreational SL would also be expected to give an unrealistic overestimate.

The arsenic concentration reported for the 8/6, 06:30 sample also corresponds to a concentration less than ATSDR's Minimal Risk Level (MRL) for an acute exposure to drinking water contaminated with arsenic.

There are a couple of metals for which the original R8 SL spreadsheet had no entries: total chromium, lead and manganese. For these I consulted drinking water MCLs and Health Advisories, ATSDR Minimal Risk Levels and EPA Water Quality Criteria.

•□□□□□ Total chromium: The total chromium concentration reported for the "worst case" sample (8/5, 16:15; 085-1482) was below the drinking water MCL for total chromium.

•□□□□□ Lead: The lead concentration (25,600 D ug/L) reported for the "worst case" sample (8/5, 16:15; 085-1482) was greatly elevated over both the lead drinking water MCL (15 ug/L) and the Water Quality Criteria (WQC) for freshwater aquatic organisms (65 ug/L for acute exposures) – there is no ATSDR MRL nor human health WQC for lead. Similar to the situation with arsenic, the sample (8/6, 06:30; 085M-1486) collected a little over 14 hours later at the same location showed a markedly lower lead concentration (88.3 D ug/L, marginally above the WQC), again indicating exposure to the "pulse' is transitory.

•□□□□□ Manganese: The manganese concentration (12,200 D ug/L) reported for both the "worst case" sample (8/5, 16:15; 085-1482) is markedly above the EPA 10 day drinking water Health Advisory (1,000 ug/L) protective for children. Again, similar to the situation with arsenic and lead, the sample (8/6, 06:30; 085M-1486) collected a little over 14 hours later at the same location showed a markedly lower manganese concentration (1,170 D ug/L, approximately 20% above the 10 day child HA), again indicating exposure to the "pulse' is transitory.

The screening levels used in this evaluation are generally designed to be protective of human health for repeated exposures involving direct contact over periods of days to weeks or years. While there are some exceedances of these screening levels, the sampling data to date indicates that exposures to such levels would likely be transitory (perhaps even less than 24 hours in some cases) as the "pulse" travels downstream. In addition, as the pulse merges with uncontaminated water in downstream water bodies (e.g., Animas River, San Juan River) it will likely become further diluted and spread out so that anticipated exposures can be expected to be correspondingly lower and thus more health protective.

Gerald F.S. Hiatt, Ph.D.

Senior Regional Toxicologist

U.S. EPA, Region 9

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Please be advised I have only intermittent and limited ability to read and send email when I am not in the office (e.g., when on travel), therefore please be patient with any communication delays.

From: Black, Ned
Sent: Tuesday, August 11, 2015 9:29 AM
To: Guria, Peter; Hiatt, Gerald
Subject: RE: Additional Gold King Mine statement/update 8/10

No comment from me on HH risk; I defer to Gerry. Ecorisk wasn't mentioned in these messages; here's my opinion pasted below on the same August 5 & 6 data. I sent this to Randy yesterday. Bottom line is there may well have been significant toxicity to aquatic wildlife the first couple days; at this point anything which was going to die should already have done so.

I haven't run the following through the EU yet, but I wanted to respond to Rusty sooner. I looked at the data from August 5 & 6 posted on epaosc.org for the Upper Animas River. From the perspective of acute ecotoxicity of the water to fish, amphibians (frogs), and/or stream insects, the bad actors are zinc, copper, and cadmium, in that order. A second tier of poor actors is arsenic, chromium and mercury (Hg only in Cement Creek).

For these judgment calls I used the acute toxicity values instead of the lower chronic values since my understanding conceptual exposure model was a spike of metals followed by steady dilution. The acute values I used, which should not be viewed as endorsed by the EU yet, are (ug/L): As 340, Cd 2, Cr 16, Cu 2.3, Zn 120, and Hg 1.4.

My professional guess is that anything that was going to be killed has already died. I'm also professionally guessing that rivers in the area experience turbidity spikes on a regular basis during the monsoon (summer thunderstorm season) and that the biological community is used to hunkering down and rebounding from sedimentation events. So I think the toxicity from metals is likely the worst problem.

ned black, ph.d.

us epa r9

regional cercla ecologist

415-972-3055

Please be advised I currently have limited access to email when I am not in the office (e.g., on travel), therefore please be patient with any communication delays.

From: Guria, Peter
Sent: Tuesday, August 11, 2015 7:25 AM
To: Hiatt, Gerald; Black, Ned
Subject: FW: Additional Gold King Mine statement/update 8/10

Please verify this is accurate for me please. thanks

From: Allen, HarryL
Sent: Tuesday, August 11, 2015 7:22 AM
To: Harris-Bishop, Rusty; Manzanilla, Enrique; Blumenfeld, Jared; Strauss, Alexis; Kao, Jessica; Zito, Kelly; Guria, Peter
Subject: Fwd: Additional Gold King Mine statement/update 8/10

Risk message based on spill site data:

Low risk of human health effects from contact with or ingestion of river water (even considering a 30 day repeated exposure).

Low risk of adverse effects on livestock from water ingestion or contact.

pH is normal. Avoid orange colored water as a precaution. Always wash w soap and water after being in contact w river water.

Sent from my iPhone

Begin forwarded message:

From: "Cristiano, Gina" <Cristiano.Gina@epa.gov>
Date: August 11, 2015 at 2:15:13 AM PDT
To: Megan Crandall <mcrandal@blm.gov>, Donald Hoffheins <dhoffhei@blm.gov>, "larry.wolk@state.co.us" <larry.wolk@state.co.us>, "Urdiales, Aaron" <Urdiales.Aaron@epa.gov>, "Ackerman, Joyce" <Ackerman.Joyce@epa.gov>, "Allen, HarryL" <Allen.HarryL@epa.gov>, "Allison.Majure@state.nm.us" <Allison.Majure@state.nm.us>, "Bahrman, Sarah" <Bahrman.Sarah@epa.gov>, "Bohan, Suzanne" <bohan.suzanne@epa.gov>, "bsmartinez@fs.fed.us" <bsmartinez@fs.fed.us>, "Buhl, Rick" <Buhl.Rick@epa.gov>, Butch Knowlton-LaPlata Co EM <knowltonbk@co.laplata.co.us>, "Card, Joan" <Card.Joan@epa.gov>, "Chavez, Luke" <Chavez.Luke@epa.gov>, "Copeland, Michael" <Copeland.Michael@epa.gov>, "Crossland, Ronnie" <Crossland.Ronnie@epa.gov>, "dariotti@utah.gov" <dariotti@utah.gov>, "david.kreutzer@state.co.us" <david.kreutzer@state.co.us>, "david.kurz@state.co.us" <david.kurz@state.co.us>, "Dhieux, Joyel" <Dhieux.Joyel@epa.gov>, "dietrich@utah.gov" <dietrich@utah.gov>, "director@sjcph.org" <director@sjcph.org>, "doug.jamison@state.co.us" <doug.jamison@state.co.us>, "dspangler@utah.gov" <dspangler@utah.gov>, "dwong@utah.gov" <dwong@utah.gov>, "egaddis@utah.gov" <egaddis@utah.gov>, "Eoc, Epahq" <Eoc.Epahq@epa.gov>, "Faulk, Libby" <Faulk.Libby@epa.gov>, "Foster, Althea" <Foster.Althea@epa.gov>, "Garcia, David" <Garcia.David@epa.gov>, "gary.baughman@state.co.us" <gary.baughman@state.co.us>, "Gleason, Michael" <Gleason.Michael@epa.gov>, "greg.naugle@state.co.us" <greg.naugle@state.co.us>, "Griswold, Hays" <Griswold.Hays@epa.gov>, "Hayes, Mark" <hayes.mark@epa.gov>,

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Cc: "Freed, Chris" <Freed.Chris@epa.gov>
Subject: Additional Gold King Mine statement/update 8/10

All,

The following information is also being released:

EPA has compared the surface water quality data collected on August 5 and 6 to screening

levels for human health developed by EPA. The screening levels for human incidental ingestion during recreation are based on an exposure duration totaling 60 days, 8 hours/day. The State of Colorado has developed screening levels for agricultural exposure. The screening levels for agricultural exposure are based on an exposure duration totaling 30 days.

Based on the data we have seen so far, EPA and ATSDR do not anticipate adverse health effects from exposure to the metals detected in the river water samples from skin contact or incidental (unintentional) ingestion. Similarly, the risk of adverse effects to livestock that may have been exposed to metals detected in river water samples from ingestion or skin contact is low. It is advisable to avoid areas with orange discoloration in the river water.

Although the pH levels between Cement Creek and Durango have returned to baseline levels washing with soap and water after contact with the river water is a sound public health practice to minimize exposure to the metals and bacteria that may be present in any untreated river water.

From: Cristiano, Gina
Sent: Monday, August 10, 2015 7:43 PM
To: Megan Crandall; Donald Hoffheins; 'larry.wolk@state.co.us'; Urdiales, Aaron; Ackerman, Joyce; Allen, HarryL; 'Allison.Majure@state.nm.us'; Bahrman, Sarah; Bohan, Suzanne; 'bsmartinez@fs.fed.us'; Buhl, Rick; Butch Knowlton-LaPlata Co EM; Card, Joan; Chavez, Luke; Copeland, Michael; Cristiano, Gina; Crossland, Ronnie; 'dariotti@utah.gov'; 'david.kreutzer@state.co.us'; 'david.kurz@state.co.us'; Dhieux, Joyel; 'dietrich@utah.gov'; 'director@sjcph.org'; 'doug.jamison@state.co.us'; 'dspangler@utah.gov'; 'dwong@utah.gov'; 'egaddis@utah.gov'; Eoc, Epahq; Faulk, Libby; Foster, Althea; Garcia, David; gary.baughman@state.co.us; Gleason, Michael; 'greg.naugle@state.co.us'; Griswold, Hays; Hayes, Mark; Hestmark, Martin; 'jason.king@state.co.us'; Joshua Allan - BIA; Kahn, Lisa; 'karin.mcgowan@state.co.us'; 'KBousfield@utah.gov'; Kortuem, Patrice; 'kshelley@utah.gov'; Land, Kelcey; 'Laura.Rendon@state.nm.us'; Liane Jollon - San Juan Basin HD; llamb@utah.gov; Lloyd, Lisa; Logan, Paul; Madigan, Andrea; 'martha.rudolph@state.co.us'; McComb, Martin; McGrath, Shaun; 'meghan.trubee@state.co.us'; 'mjblanchard@fs.fed.us'; Mohr, Mindy; 'monica.sheets@state.co.us'; Myers, Craig; Mylott, Richard; Nattis, Randy; O'Connor, Darcy; Ostrander, David; 'patrick.j.pfaltzgraff@state.co.us'; 'Patrick.Longmire@state.nm.us'; R8 Documentation Unit Leader; Restivo, Angela; Russo, Rebecca; Saldenha, Jasmine; Sandoval, Joni; Sid Caesar - BIA; Sierra, Eddie; Sisk, Richard; Smith, Paula; Stavnes, Sandra; Stevenson, Peter; Thomas, Deb;

tojohns@southernute-nsn.gov; 'tyson.ingles@state.co.us'; Videtich, Callie; Ward, W. Robert; 'warren.smith@state.co.us'; Way, Steven; 'wbaker@utah.gov'; Webster, Susan; Werner, Phillip
Cc: Freed, Chris
Subject: Gold King Mine statement/update 8/10

The Gold King Mine Release statement/update for 8/10 is attached.

Thank you, Gina

Gina Cristiano

Emergency Response & Planning Coordinator

EPA Region 8

303-312-6688